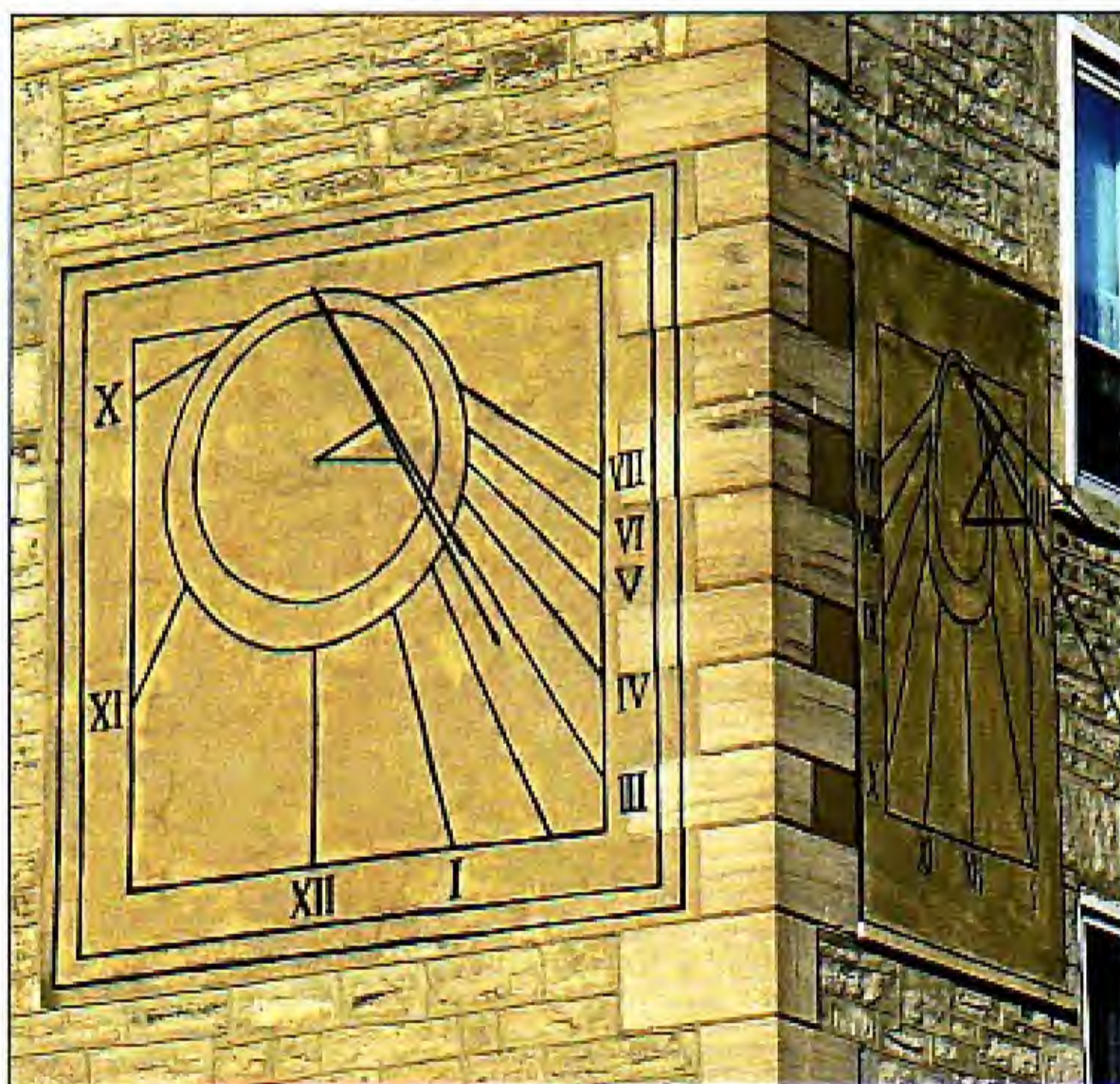


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The Compendium*

Journal of the
North American Sundial Society



It is eternity now. I am in the midst of it. - Richard Jeffries

* *Compendium*, "giving the sense and substance of the topic within small compass." In dialing, a compendium is a single instrument incorporating a variety of dial types and ancillary tools.

*Nicola Severino Finds Important News About
Ecliptical Planetary Hours*
Fer J. de Vries (Eindhoven, Netherlands)

Introduction.

For many years I have been interested in planetary hours and in 1992 I published two notes ¹⁾ about this subject in the bulletin of *De Zonnewijzerkring* (The Dutch Sundial Society). In the course of the years I got help from several gnomonists and in 2007 I got extra information from Mario Arnaldi of Italy, who found some interesting texts in old literature. For me this was a reason to write an article ²⁾ in our bulletin and I wrote a note ³⁾ on the website of *De Zonnewijzerkring*.

Except for a picture in the scholarly book by Joseph Drecker ⁴⁾, 1925, in which it is shown how (ecliptical) planetary hourlines look on a horizontal sundial, I never have seen an image in older literature. This is changed now.

Nicola Severino of Italy recently (Oct. and Nov. 2008) found three pictures in some old literature. One image shows the pattern for a horizontal sundial in which one such hourline is seen and the other images show tympana for an astrolabe with the (ecliptical) planetary hourlines. These new images are the main reason to write this article.

What are planetary hours?

The photo below shows one of the two beautiful sundials on the front of the Ratsapotheke in Görlitz, Germany. The emphasized hourlines are for the antique hours, also named as temporal, Jewish or unequal hours, and are based on the diurnal arc.

These hours are the 12th part of the time between sunrise and sunset and are equal in one day but change in length during the seasons. In the Northern Hemisphere, these hours are long in summer and short in winter.



Sundials on the front of the Ratsapotheke in Görlitz, Germany

Symbols for the planets are drawn between the hourlines and because of that these hours are also called planetary hours. There are more sundials with these planetary hourlines, and in old and new literature as well we may read that the planetary hours are the same as the antique hours.

However, in the book by Drecker it is written that this is an error. Drecker points in a footnote to Sacrobosco⁵⁾, around 1230, who had written: *Hora naturalis est spatium temporis in quo medietas signi peroritur.* (A natural hour is the space of time in which half a sign rises.) These hours then are not based on the diurnal arc but on the ecliptic. According to Drecker, Sacrobosco's definition should be used for the planetary hours.

There are more sources which refer to Sacrobosco and an example is in the book by Maurolicus⁶⁾ where we may read: *Bene igitur dixit Ioannes Sacroboscus, cum diffinivit horam naturalem, hoc est inaequalem, sive temporalem, esse spacium temporis, quo peroritur dimidium signi in zodiaco.*

Another source, also recently found by Nicola Severino, is an English translation⁷⁾, 1651, of a Latin book by Agrippa⁸⁾, printed in 1533. A certain paragraph has as its title: *Of the true motion of the heavenly bodies to be observed in the eight sphere, and of the ground of planetary hours.* In this paragraph we may read:

... so also in planetary hours the ascensions of fifteen degrees in the Eclipticke constituteth an unequall or planetary hour, whose measure we ought to enquire and find out by the tables of the oblique ascensions of every region.

The full text of this paragraph is added in an addendum.

So far we have different names and different definitions of planetary hours but we may conclude that at least a time system, based on the rise of half a sign of the ecliptic, was known in older times and we continue our story with the name Ecliptical Planetary Hours.

Characteristics of ecliptical planetary hours.

The definition of an ecliptical planetary hour now is the rise of half a sign of the ecliptic. A sign is 30°, so half a sign is 15°; and one ecliptical planetary hour therefore is the rise of 15° of the ecliptic. The

counting starts with sunrise and, as with the antique hour, the first hour starts then. Just as with the antique hours we think in periods of time, not in moments of time.

There are always 6 signs of the ecliptic above and 6 signs below the horizon. This means that in the time between sunrise and sunset there are 12 ecliptical planetary hours, just as with the antique hours. In the course of a year the length of an ecliptical planetary hour as well of an antique hour changes because the length of the time between sunrise and sunset changes with the seasons.

But the length of the hour changes within one day because the time needed for a sign to rise is different. Sometimes a sign rises fast; another time a sign rises slowly. So the length of an ecliptical planetary hour also changes in one day while an antique hour is constant in one day.

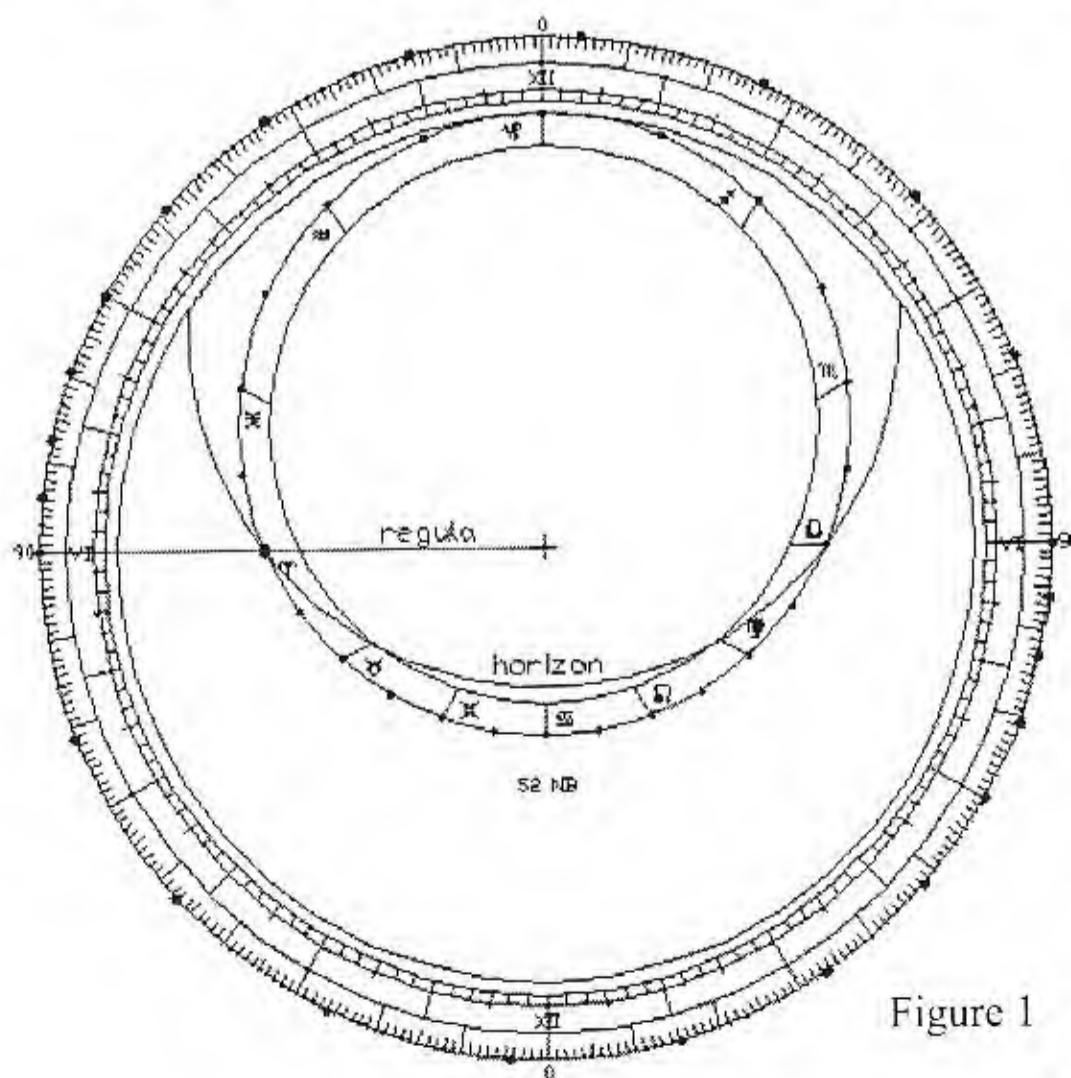


Figure 1

With an astrolabe, one of the most beautiful instruments in astronomy, it is rather easy to show how the length of an ecliptical planetary hour changes in one day⁹⁾. As an example here this is shown for the first day of spring or 0° Aries.

At the start set the rete with the point for 0° Aries on the horizon at the left side. Also set the regula at this spot. This position is drawn in figure 1. The regula shows that the sun rises at 6 o'clock with an hourangle of 90° before noon.

Now turn the rete and the regula together until the point of 15° Aries is on the horizon left. Now one ecliptical planetary hour has past.

Repeat this step for each next 15° of the ecliptic to rise until the point of 0° Aries is on the horizon at the right side where the sun sets.

This position is drawn in figure 2, and in the day 12 ecliptical planetary hours have passed.

All the regula positions are drawn and it is seen that the hours change in length from short in the morning to long in the afternoon.

The bottom image now shows the

astrolabe in the position where on the first day of autumn, 0° Libra, the sun rises. If we repeat the sequence as above we get the same hourlines but mirrored, with long hours in the morning and short hours in the afternoon.

How do ecliptical planetary hours look on a sundial?

Now that we have insight into the characteristics of the ecliptical planetary hours, we are able to draw a sundial with these hourlines. In the past this would have been a monkish work, even if an astrolabe would have been available, but in our time a computer program such as ZW2000¹⁰⁾ can do the job in a minute.

In the figure 3 a horizontal dial for latitude 52° North is shown. For clarity the drawing is cut in two parts; for the lengthening days and shortening days separately.

No datelines are added so the shapes of the lines are not disturbed by other lines.

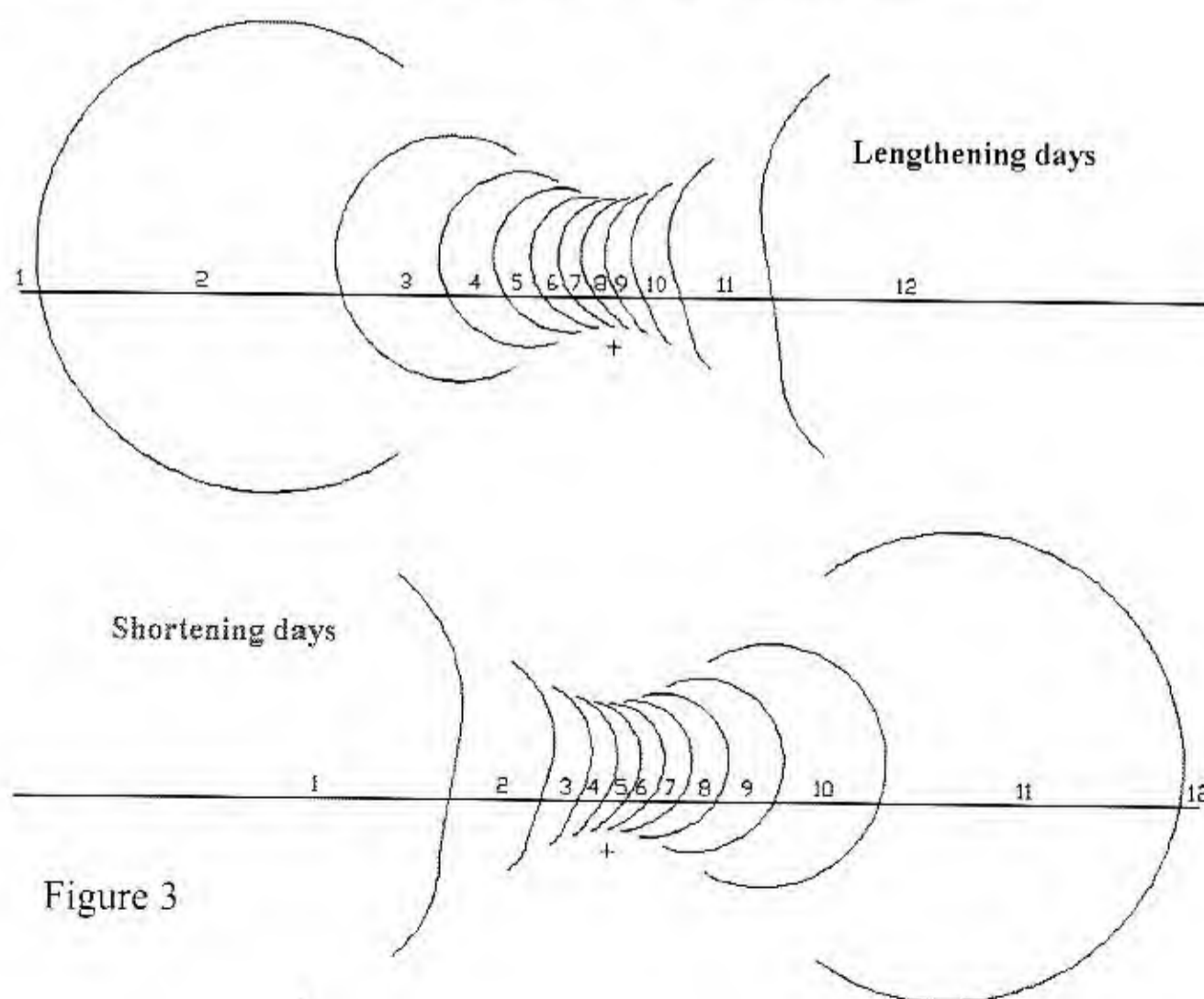


Figure 3

The first image found by Nicola Severino.

In a Latin book from 1644 by Ioanne Caramvel Lobkowitz¹¹⁾ this picture of a horizontal sundial is found.

In this dial we see seven datelines for the shortening days, labelled with the signs for Cancer to Capricornus.

Further we see straight lines for local apparent time. But for us the other curved lines are of importance.

These lines are labelled with Roman numbers in the sequence VI, V... II, I, (noon), I, II... V, VI.

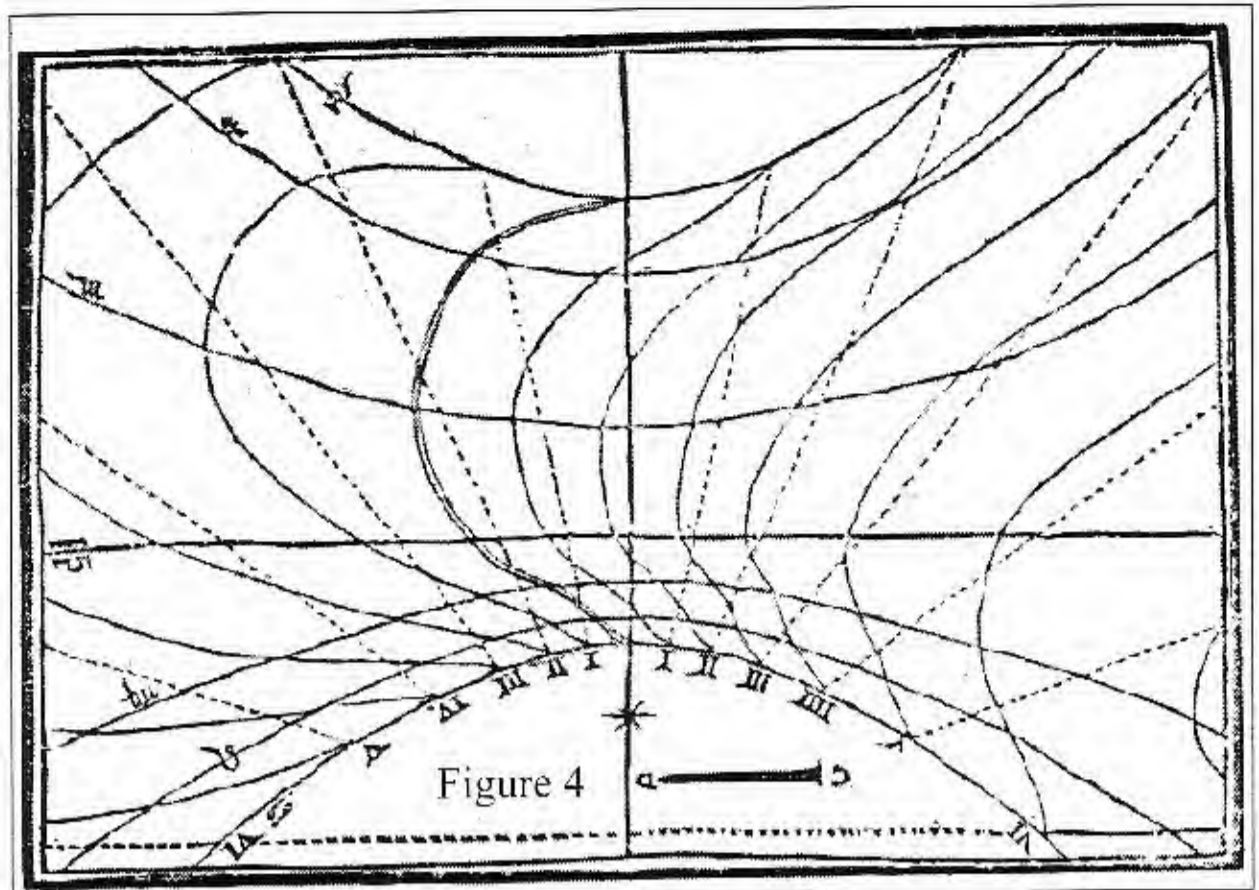


Figure 4

Finally, we see a pin gnomon as well as the location where this gnomon should be placed.

Being busy with studying what these curved lines could mean I discovered I had to mirror the picture. Therefore the rest of the figures of this dial are drawn with a mirrored image. The reason for mirroring the picture I will explain at the end of this paragraph.

In the book by Lobkowitz several times the latitude of 52° was mentioned and for that reason a horizontal sundial for that latitude and with the same lines was calculated, drawn and scaled to the

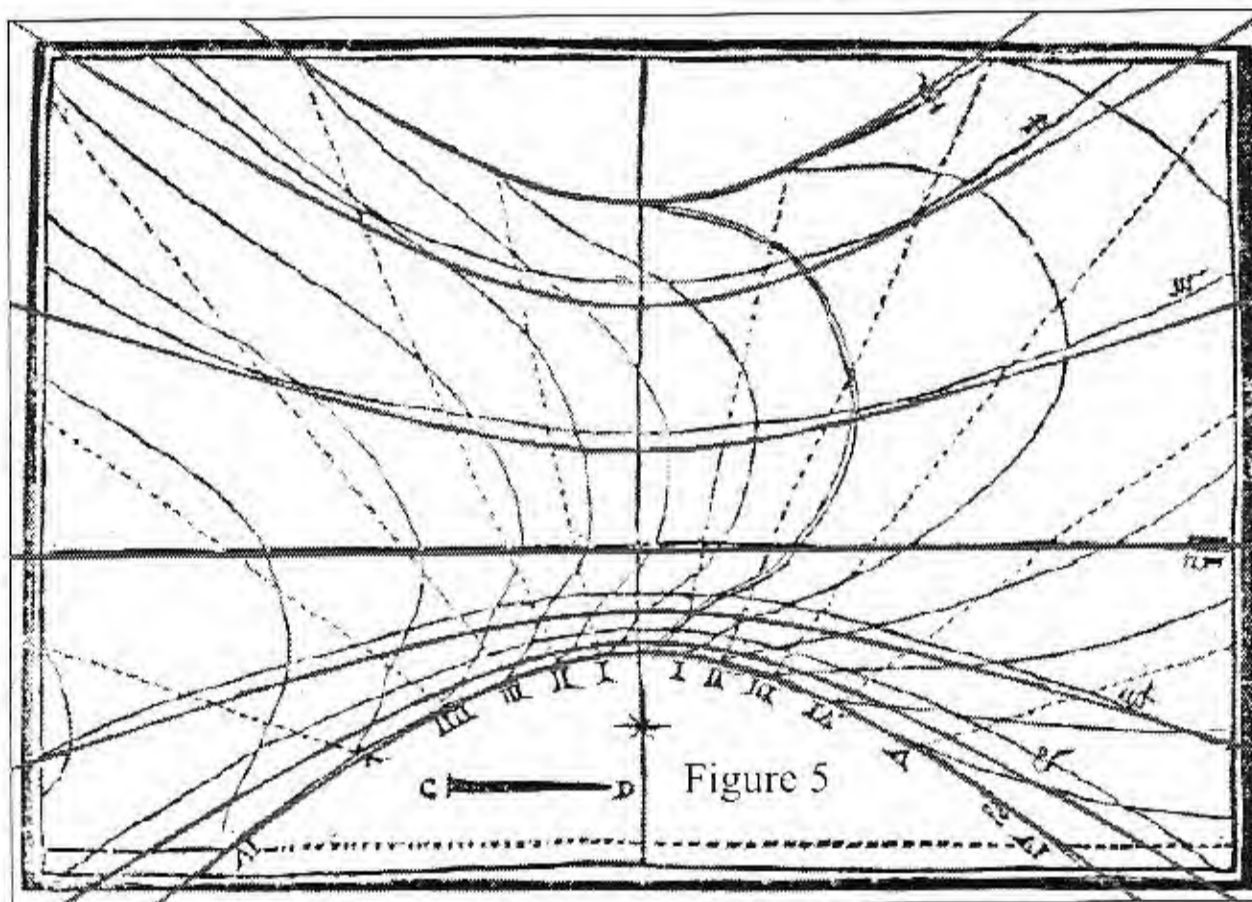


Figure 5

dimensions of the image from Lobkowitz. The pattern was placed on top of the image from Lobkowitz and the result is shown in three steps.

In the mirrored figure 5, the datelines are added and the lines for the solstices and equinoxes fit well.

In figure 6 the lines for local apparent time are added. The center of the hourlines is not precisely placed but the direction of all the hourlines fits very well.

In figure 7 the ecliptical planetary hourlines are added. The double line in the center fits very well with the end of

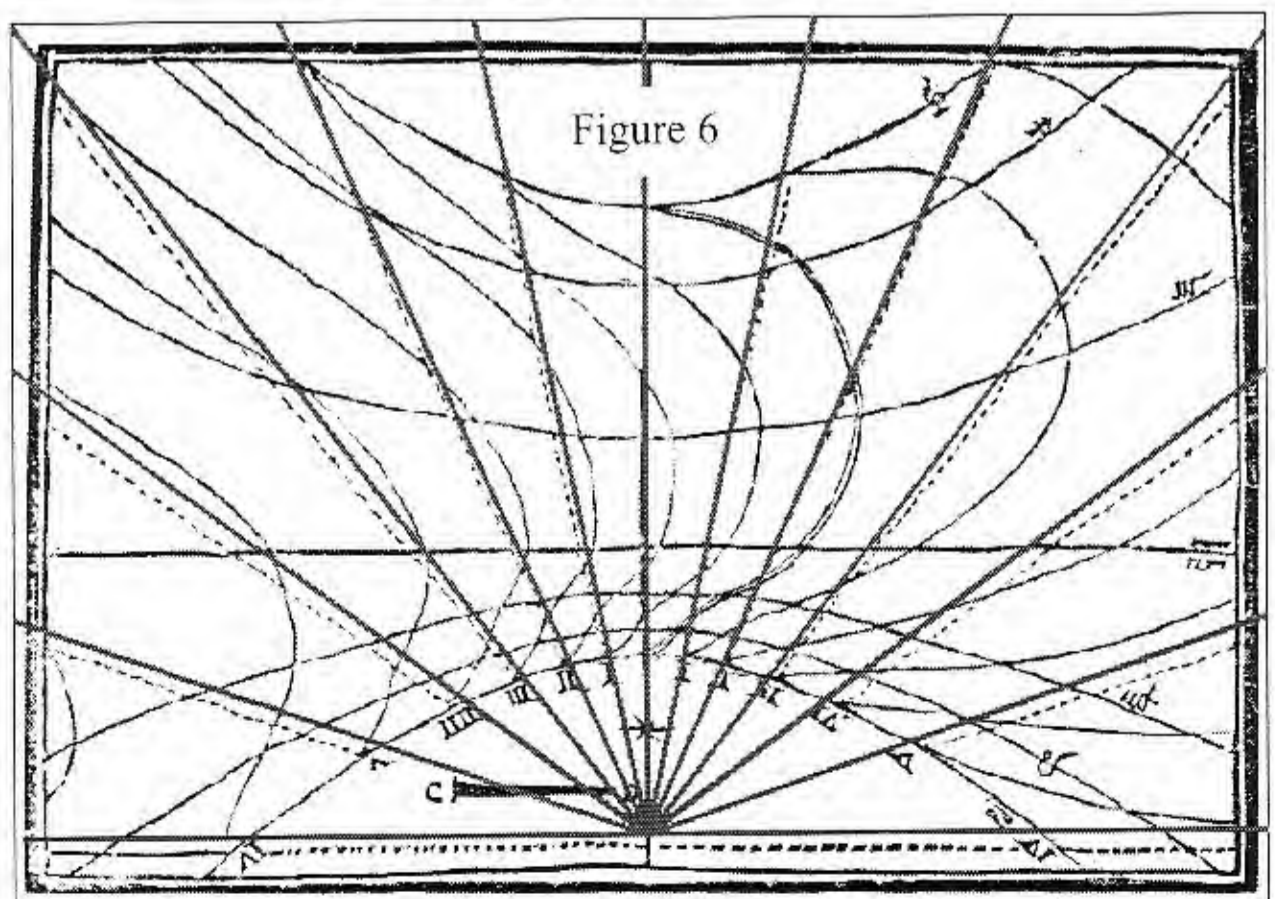
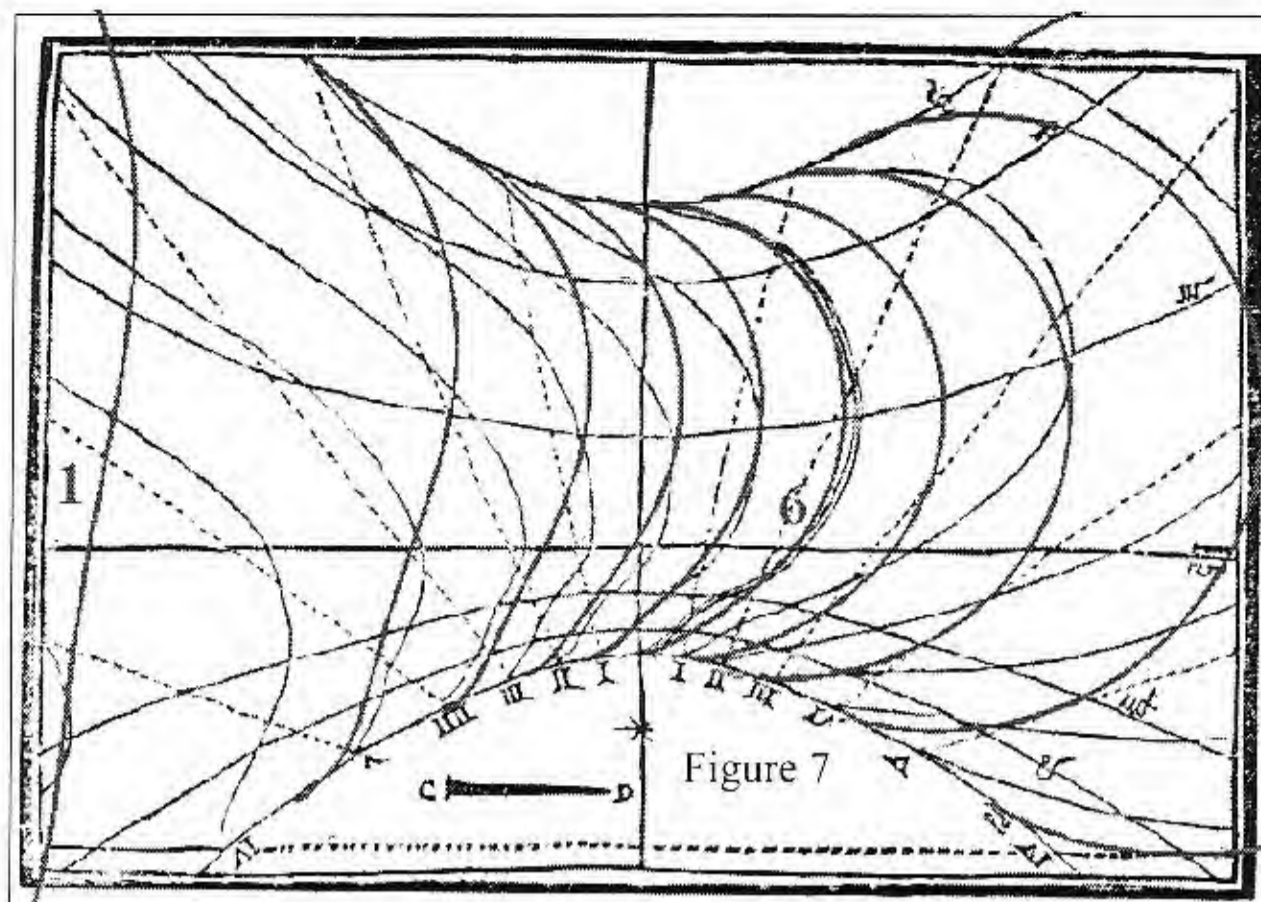


Figure 6



the 6th ecliptical planetary hourline. The other curved lines do not fit.

We may conclude that the result we now have found shows at least one of the ecliptical planetary hourlines on a sundial and we are very pleased with this result.

But what do the other curved lines mean?

For two dates the intersection points of the datelines and the curved lines are accented in figure 8.

Further, a table from the book by Lobkowitz in the same paragraph

in which the dial is presented, is shown here as figure 9.

Looking closer at the pattern of the dial it is seen that the accented points on the equinox lie, in the time system for the local apparent time, all one hour apart. This is confirmed in the table where the series of times is: 10:17, 11:17, 12:17 ...

So the other curved lines show the number of hours before or after the end of 6th ecliptic planetary hourline as may be seen in the sequence VI, V, ..., II, I, (noon), I, II, ..., V, VI of the numbering.

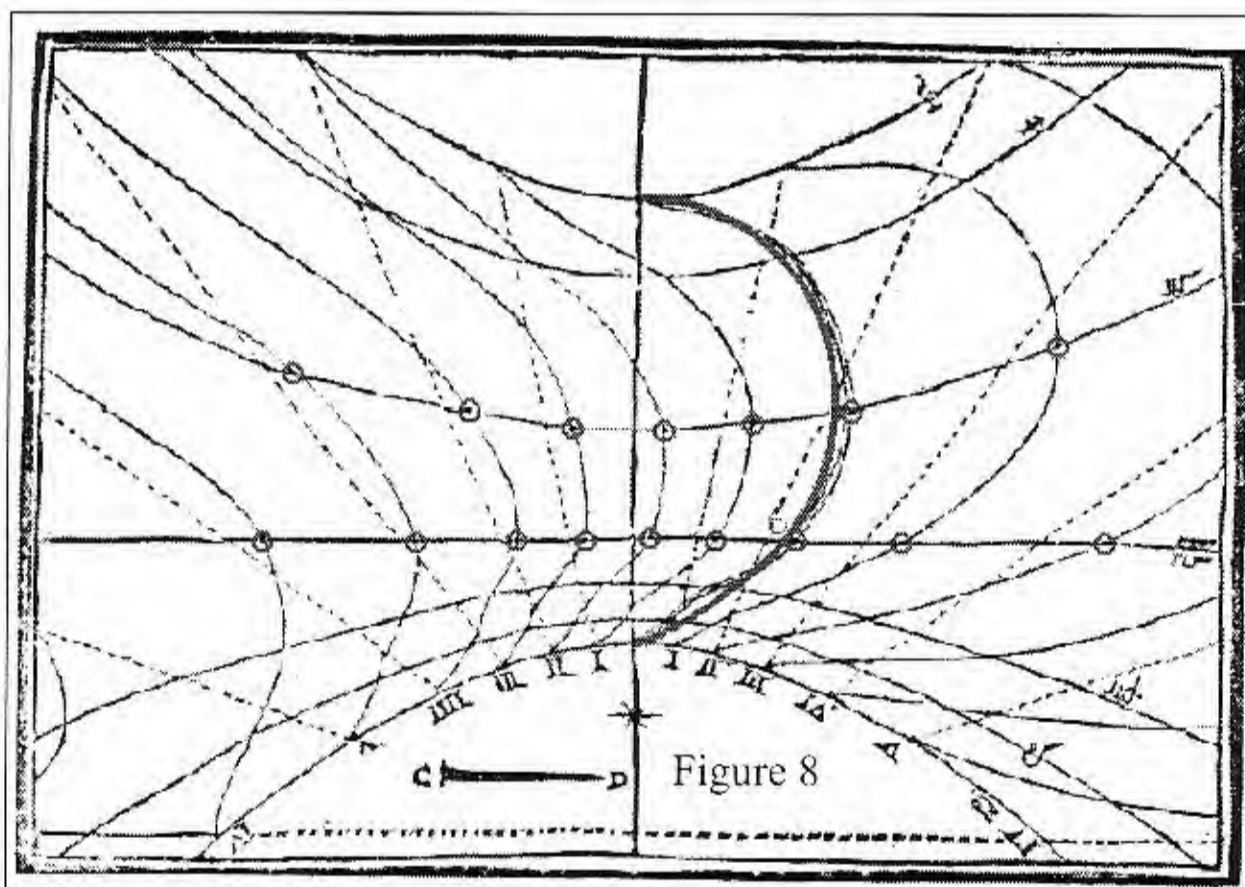
The same is due for the second series of points for the sign of Scorpius where the series reads as 10:11, 11:11, 12:11 ... and also the other series in the table show one hour difference.

Here we have a strange combination of one ecliptical planetary hourline, for the end of the 6th hour, which is the starting point for counting in equatorial hours of 15°.

In the table we may also see that Lobkowitz names the end of the 6th hour "medium caeli".

Now it is obvious why I needed to mirror the picture from Lobkowitz.

Without the image mirrored, the values in the table did not correspond with the local apparent time on the dial.



Horz in medium Caelum seu gradum nonagesimum.					Medium Caeli.	Horz à medio Caeli seu gradu nonagesimo.				
IV	III	II	I	X	I	II	III	IV &c.		
8. 0'	9. 0'	10. 0'	11. 0'	12. 0'	1. 0'	2. 0'	3. 0'	4. 0'		
8. 43'	9. 43'	10. 43'	11. 43'	12. 43'	1. 43'	2. 43'	3. 43'	4. 43'		
9. 36'	10. 36'	11. 36'	12. 36'	1. 36'	2. 36'	3. 36'	4. 36'	5. 36'		
10. 17'	11. 17'	12. 17'	1. 17'	2. 17'	3. 17'	4. 17'	5. 17'	6. 17'		
10. 11'	11. 11'	12. 11'	1. 11'	2. 11'	3. 11'	4. 11'	5. 11'	6. 11'		
9. 18'	10. 18'	11. 18'	12. 18'	1. 18'	2. 18'	3. 18'	4. 18'	5. 18'		
8. 0'	9. 0'	10. 0'	11. 0'	12. 0'	1. 0'	2. 0'	3. 0'	4. 0'		

Figure 9

Also if I had not mirrored the image I would have had to calculate the ecliptic planetary hourlines for the lengthening days while on the dial the labels at the datelines are for the shortening days.

The second image found by Nicola Severino.

In a book around 1508 – 1520 by an unknown author ¹²⁾ an image of a tympan for an astrolabe for a latitude of about 48° North is found. On this tympan all the ecliptic planetary hourlines are seen, not only for the day hours but also for the night hours.

For the same latitude such a tympan is drawn with a computer program and it is seen that all the lines match very well. (Fig. 10)

In this book many more drawings are published but hardly any text.

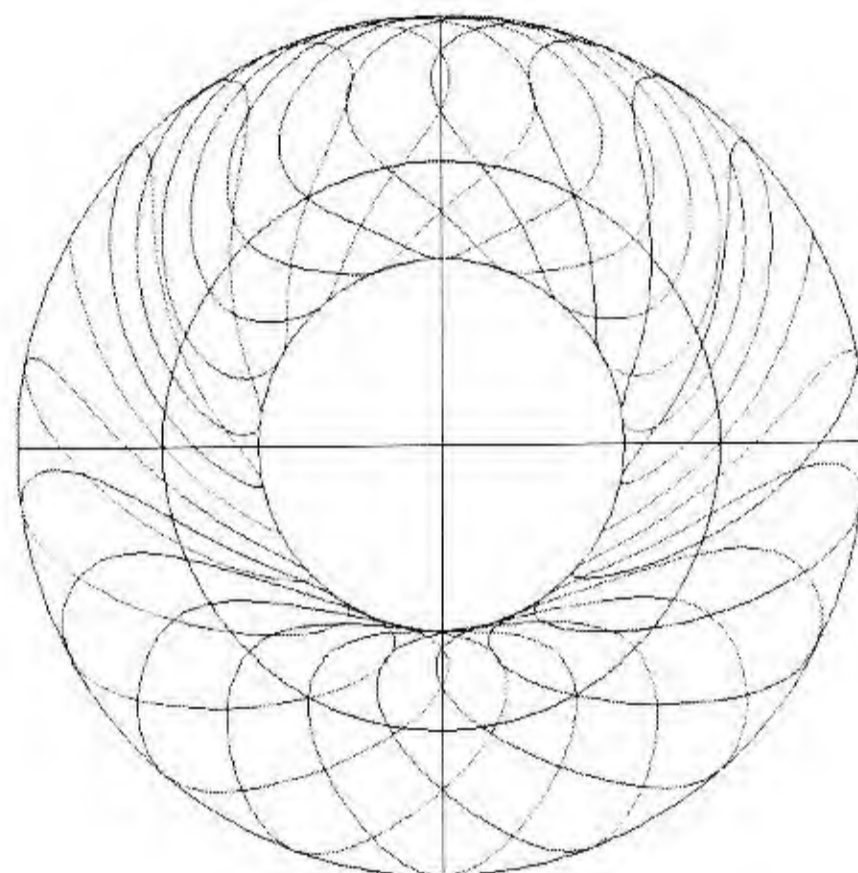
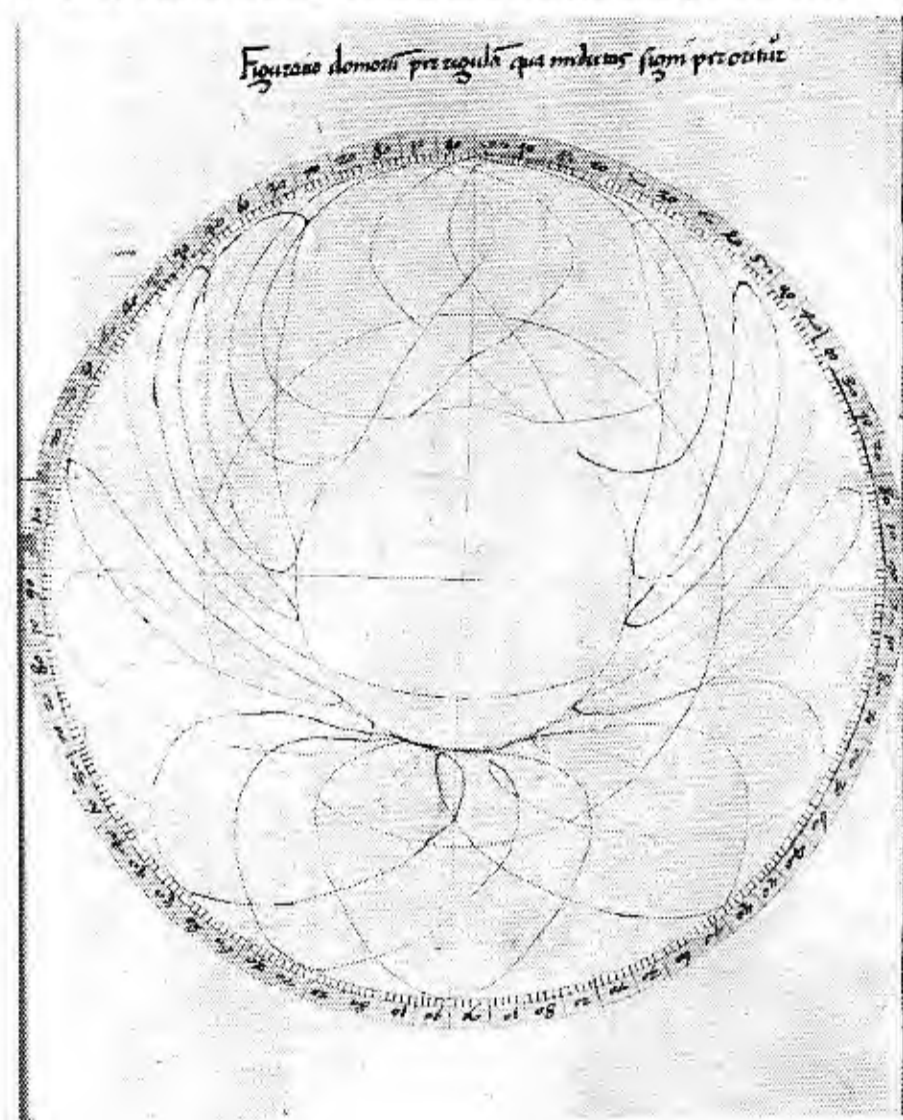


Figure 10

The third image found by Nicola Severino.

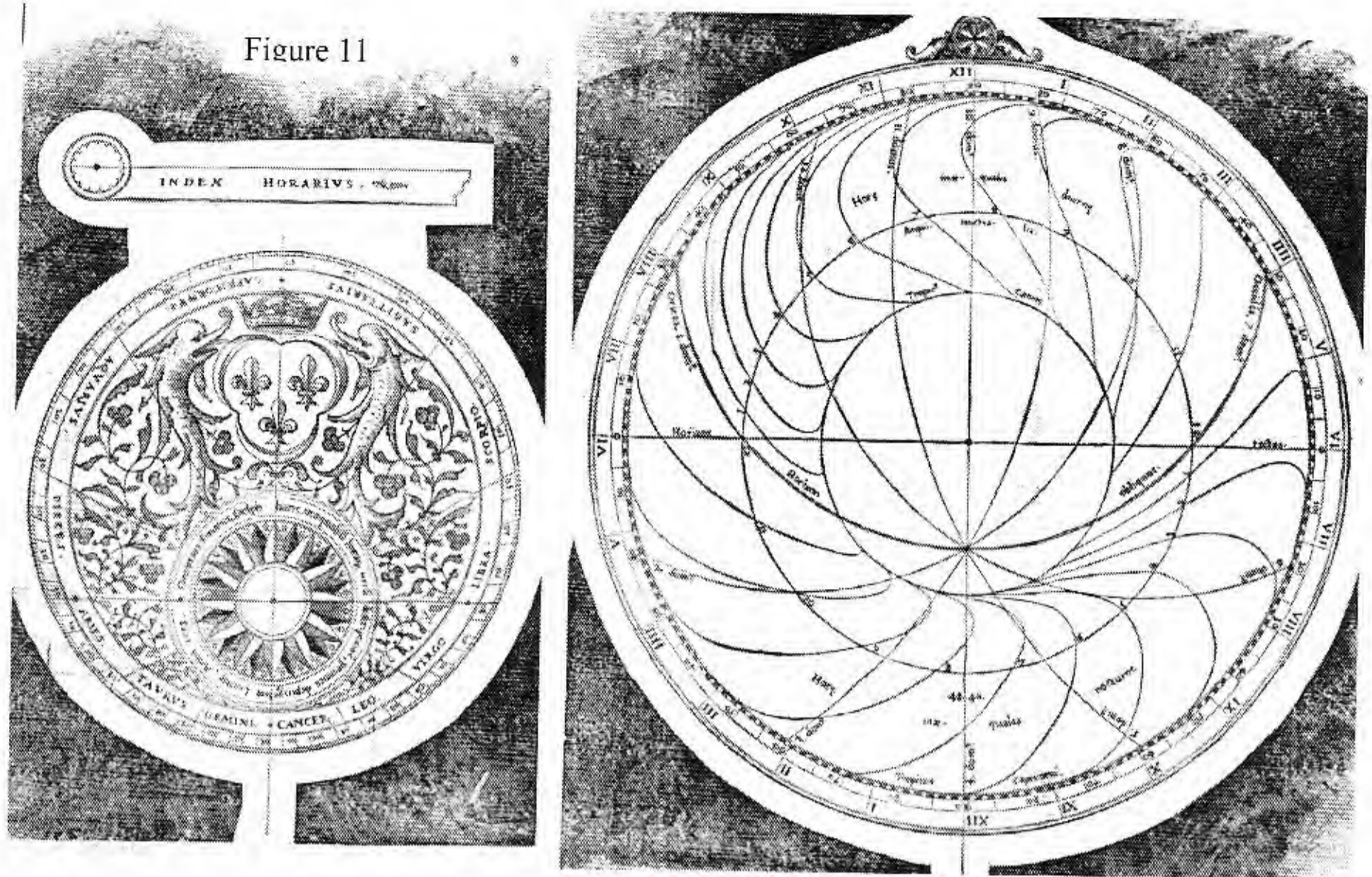
In a book by Oronce Finé ¹³⁾, 1553, the image of the tympan below (Fig. 11) is found. Here only half of the ecliptical planetary hours are drawn. This is more convenient in use but now two tympanans will be needed. As mentioned in the book the tympan is for a latitude of 48° 40' N. In the upper part the hourlines for the day are drawn, in the lower part for the night.

Overlaying the tympan with calculated ecliptical planetary hourlines, as I did before, shows that the lines fit very well and it is concluded that Oronce Finé did a very good job. However, I discovered that the day hours are for the period from Capricornus to Cancer with lengthening days and the night hours are for Cancer to Capricornus with shortening days.

Assuming that his image is for Capricornus to Cancer it is seen that for 0°Aries the first night hour is short. But this hour should be long as may be seen in figure 12.

Did Oronce Finé make an error? Not necessarily. It is possible to distribute the needed patterns in the way he did but in use this is less convenient.

Figure 11



Tables for ecliptical planetary hours.

Another important find by Nicola Severino is a German book by Eliam Crätschmairum¹⁴⁾, 1626.

In the main part of this book tables are found with values for the start time for each of the 24 ecliptical planetary hours for each day in a year. These start times are expressed in local apparent time, all for the latitude of $50^{\circ} 48'$ North.

In the tympan for that latitude (Fig. 13) all the ecliptical planetary hours for the shortening days are drawn. For the arbitrary date of the 1st of November the declination circle is added and all the regula positions through the intersection points of the hours with the date circle are drawn, so we can read all the times for the start of the ecliptical planetary hours.

For the day and the night hours the counting starts on the horizon with hour 1.

For the start of the day hours 2, 3, 7 and the night hours 5, 9, 11, values are added as I read on a larger version of this tympan.

The values of all the 24 hours for this date are compared with the appropriate tables. A part of these tables is seen here.

The table (Fig. 14) at top is for the day hours (*Tagstunden*), the lower part is for the night hours (*Nachtstunden*).

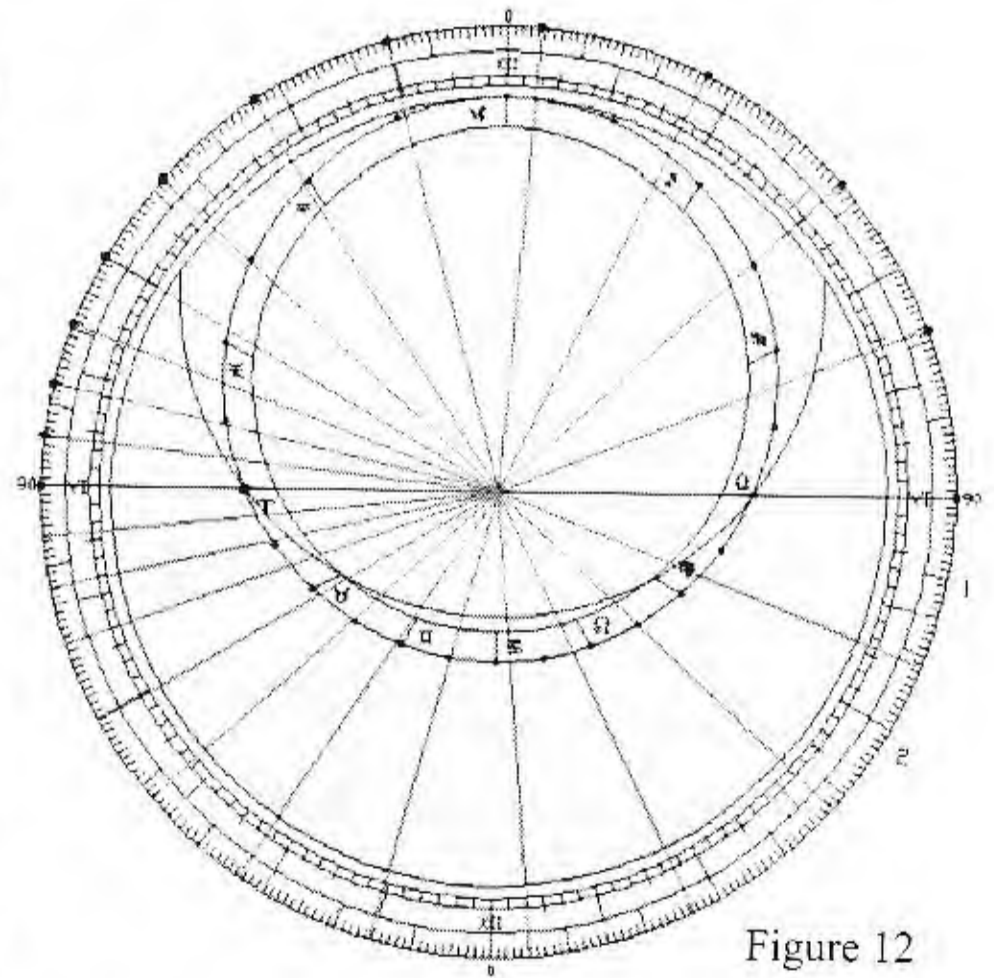


Figure 12

Planetary Hours Table		<h1>Planeten Stundt Taffel</h1> <p>Sub Lit. B.</p>													
Day hours		h	2	♂	☉	♀	♄	♅	♆	♁	♂	☉	♄	♅	♆
Saturday	Sonnabend	1	2	3	4	5	6	7	8	9	10	11	12		
Thursday	Donnerstag		1	2	3	4	5	6	7	8	9	10	11	12	
Tuesday	Dienstag			1	2	3	4	5	6	7	8	9	10	11	12
Sunday	Sonntag	12			1	2	3	4	5	6	7	8	9	10	11
Friday	Freitag	11	12			1	2	3	4	5	6	7	8	9	10
Wednesday	Mittwoch	10	11	12			1	2	3	4	5	6	7	8	9
Monday	Montag	9	10	11	12			1	2	3	4	5	6	7	8
Night hours	Nachst.	8	9	10	11	12	♄	♅	♆	♁	♂	☉	♄	♅	♆

Figure 16

Conclusion.

Considering the finds by Nicola Severino discussed here, we may conclude that besides planetary hours based on the diurnal arc, it is really true there is a system in which the planetary hours are based on the ecliptic. We are very pleased with all the finds by Nicola Severino, who shared all of this with us and who gave us permission to publish about this important material in the website of Nicola Severino, in *The Compendium*, and in the *Bulletin of De Zonnewijzerkring*.

Thanks go to Mac Oglesby for reading and improving the English text. The website of Nicola Severino is: <http://www.nicolaseverino.it/>

Literature and notes.

- 1 Fer J. de Vries, Planetenuren, *Bulletin of De Zonnewijzerkring*, nr. 92.1, January 1992.
- 2 Fer J. de Vries, Hora naturalis: antiek of planetenuur?, *Bulletin of De Zonnewijzerkring*, nr. 08.1, January 2008.
- 3 Website of De Zonnewijzerkring, article of the month, archives 2007, month 07-12.
<http://www.de-zonnewijzerkring.nl>
- 4 Joseph Drecker, *Die Theorie der Sonnenuhren*, 1925. See also addendum.
- 5 Johannes de Sacrobosco, *Tractatus Sphaera*, about 1230. See also addendum.
- 6 Franciscus Maurolicus, *Computus ecclesiasticus*, 1575.
- 7 *The sphere of Sacrobosco*, Lynn Thorndike, 1949.
- 8 Heinrich Cornelius Agrippa, *De occulta philosophia*, 1509-1520, printed in 1533, book 2, chap 34. See also addendum.
- 9 A small file with a demonstration of the ecliptical planetary hours on an astrolabe is added to the electronic version of *The Compendium* and is available for download as a powerpoint file at <http://www.de-zonnewijzerkring.nl/downloads/hora-naturalis-eng.zip>
- 10 ZW2000 is available for download at the website of De Zonnewijzerkring:
<http://www.de-zonnewijzerkring.nl>. links: calculate and construct, flat sundials-extensive version, download computer program.
- 11 Ioanne Caramvel Lobkowitz, *Solis et artis adulteria*, 1644.
- 12 Author unknown, *Astronomische Zeichnungen*, 1508-1520.
- 13 Oronce Finé, *De duodecim caeli domiciliis, & horis inaequalibus, libellus non aspernandus*, 1553. See addendum for title page of the book.
- 14 Eliam Crätschmairum, also Elias Kretzschmayer, Kretschmar or Kretschmer, *Horologium Zodiacale*, 1626.

Addendum.

Sacrobosco.

An English translation of Sacrobosco's *Tractatus Sphaera* by Lynn Thorndike, 1949, is at <http://www.esotericarchives.com/solomon/sphere.htm>

In chapter 3 we may read Sacrobosco's definition: ... *a natural hour is the space of time in which half a sign rises*. The complete text of chapter 3 is cited below.

RIGHT AND OBLIQUE ASCENSIONS.

It is to be noted that the six signs from the beginning of Cancer through Libra to the end of Sagittarius have their combined ascensions greater than the ascensions of the other six signs from the beginning of Capricorn through Aries to the end of Gemini. Hence those six signs first mentioned are said to rise erect, but the others obliquely. Wherefore the verses:

*They rise aright, oblique descend from Cancer's star
Till Chiron ends, but the other signs
Are prone at birth, descend by a straight path.*

And when we have the longest day of summer, when the sun is in the beginning of Cancer, then six signs rise vertically by day but six obliquely at night. Conversely, when we have the shortest day of the year, when the sun is in the beginning of Capricorn, then those six signs which rise by day do so obliquely, but by night the other six rise vertically. When, moreover, the sun is at either equinoctial point, then by day three signs rise vertically and three obliquely, and at night the same.

For the rule is: However short or long the day or night may be, six signs rise by day and six by night, nor because of the length or brevity of day or night do more or fewer signs rise.

From these facts it is gathered that, since a natural hour is the space of time in which half a sign rises, there are twelve natural hours in each artificial day, and so also in the night. Moreover, in all the circles which parallel the equator to north or south, days or nights are lengthened or shortened according as more or fewer signs rise vertically or obliquely by day or night.

Some other readings.

1) Charles-Henri Eyraud and Paul Gagnaire, *Le Ore Planetarie*, translated in Italian by Riccardo Anselmi for magazine *Web Gnomonics*, n. 3, February 2004, available for free download at: <http://www.nicolaseverino.it/riviste.htm> (Download WG n. 3.)

In French the article is published in the revue of the ANCAHA, nr. 97, 2003.

2) A. Gunella, A. Nicelli, *Un libro di Oronzio Fineo astrologo ed una polemica sulla suddivisione delle case celesti e sulle ore ineguali*, magazine *Gnomonica Italiana*, anno II, n. 5, giugno 2003.

3) N. Severino, *Ancora sulle ore Canoniche, Temporarie e Planetarie*, in *Gnomonica*, n. 2, January, 1999.

Drecker.

From the book *Die Theorie der Sonnenuhren* by Joseph Drecker, 1925, the figure with the ecliptical planetary hourlines is copied. The relevant German text in this book about this subject is translated into English by Ruud Hooijenga and his text follows below.

In close relationship with the ascendant lines are the planetary hours, which are those periods of time in which, according to Astrology, one planet rules. Erroneously, the expression planetary hours is also used for the unequal, antique hours. Here, the following should be noted.

Two great circles on the celestial sphere can be used, because of their apparent diurnal rotation, for the division of the day into hours: the equator and the ecliptic.

Selecting the equator results in equal hours; one such hour is the time between the rises of two points which are 15° apart on the equator.

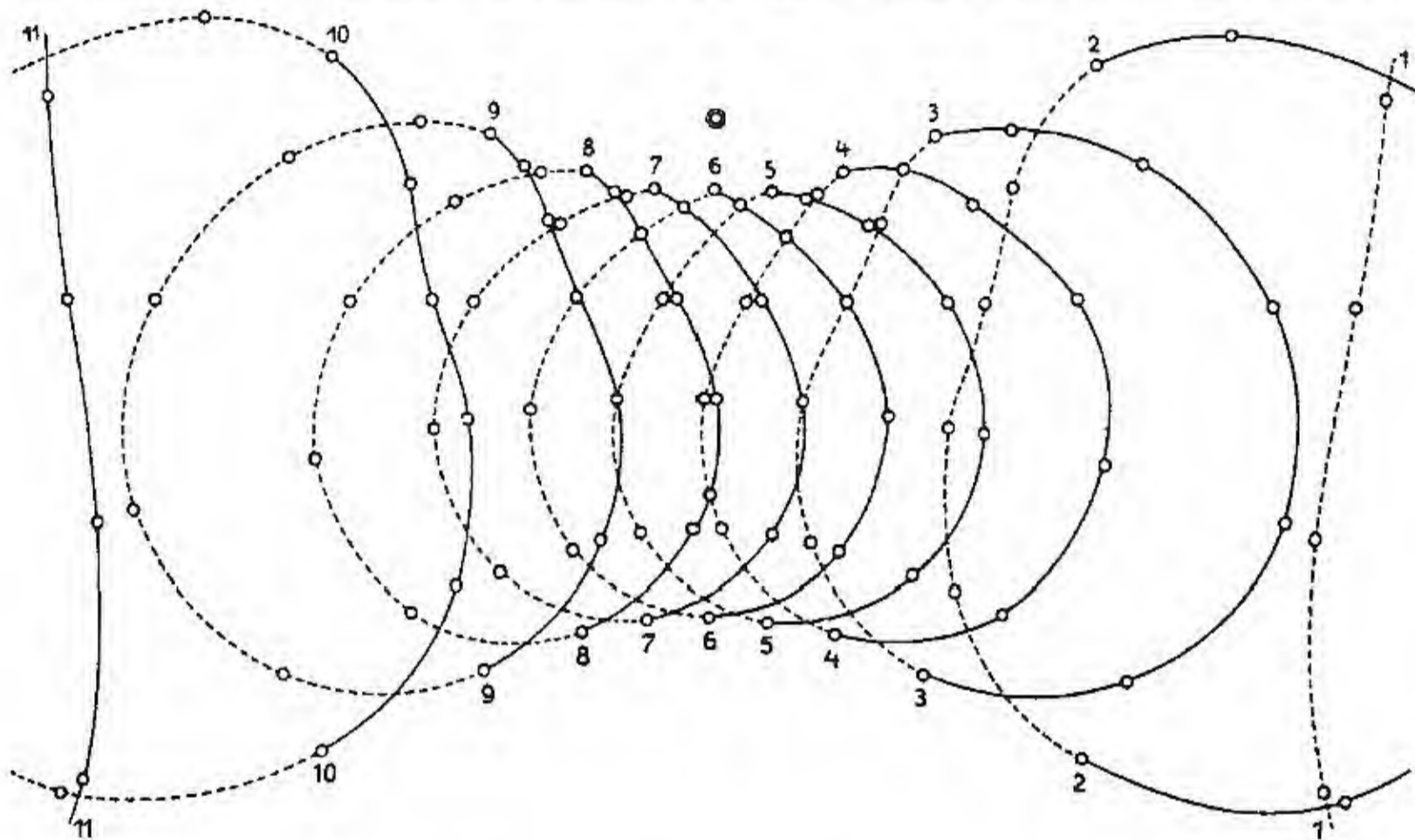
Selecting the ecliptic, however, one hour is the time that passes between the rises of two points which are 15° apart on the ecliptic.

Since each day and each night half of the ecliptic rises, one obtains 12 daily and 12 night hours. That is what the ecliptic hours have in common with the antique hours, which are derived not from a great circle, but from a diurnal arc of the sun, and therefore considered less self-evident, or natural.

The ecliptic hours on the other hand are called natural hours. They differ however substantially from the antique hours by the fact that they are of unequal duration even in the course of a single day.

Reasonably, then ("ratio postulate", says Maurolycus), only the ecliptic hours can make claim to the name of planetary hours.

Serious dialists recognize this fact, but they also point out the conflicting opinions of modern astronomers and astrologers. The confusion between the true planetary hours and the antique hours has its origin in their partial similarity, but also in a desire to avoid the difficulties in the construction of the first.



Agrippa.

On the next page is the title page of an English translation of the books by Heinrich Cornelius Agrippa. This translation was written in 1651 by J.F. Agrippa's book was written from 1509 to 1510 and printed in 1533.

Below chapter xxxiv from book 2 is cited.

Chap. xxxiv. Of the true motion of the heavenly bodies to be observed in the eighth sphere, and of the ground of Planetary hours.

Whosoever will work according to the Celestiall opportunity, ought to observe both or one of them, namely the motion of the Stars, or their times; I say their motions, when they are in their dignities or dejections, either essential or accidentall; but I call their times, dayes and hours distributed to their Dominions. Concerning all these, it is abundantly taught in the books of Astrologers; but in this place two things especially are to be considered and observed by us. One that we observe the motions and ascensions and windings of Stars, even as they are in truth in the eight sphere, through the neglect of which it happeneth that many err in fabricating the Celestiall Images, and are defrauded of their desired effect; the other thing we ought to observe, is about the times of choosing the planetary hours; for almost

all Astrologers divide all that space of time from the Sun rising to setting into twelve equall parts, and call them the twelve hours of the day; then the time which followeth from the setting to the rising, in like manner being divided into twelve equall parts, they call the twelve hours of the night, and then distribute each of those hours to every one of the Planets according to the order of their successions, giving alwayes the first hour of the day to the Lord of that day, then to every one by order, even to the end of twenty four hours; and in this distribution the Magicians agree with them; but in the partition of the hours some do different, saying, that the space of the rising and setting is not to be divided into equall parts, and that those hours are not therefore called unequal because the diurnal are unequal to the nocturnall, but because both the diurnal and nocturnal are even unequal amongst themselves; therefore the partition of unequal or Planetary hours hath a different reason of their measure observed by Magicians, which is of this sort; for as in artificiall hours, which are alwayes equall to themselves, the ascensions of fifteen degrees in the equinoctiall, constituteth an artificial hour: so also in planetary hours the ascensions of fifteen degrees in the Eclipticke constituteth an unequal or planetary hour, whose measure we ought to enquire and find out by the tables of the oblique ascensions of every region.

The complete text of the translation is at:

<http://www.esotericarchives.com/agrippa/> or directly to book 2 at:

<http://www.esotericarchives.com/agrippa/agripp2c.htm>

THREE BOOKS OF Occult Philosophy,

WRITTEN BY
Henry Cornelius Agrippa,

OF
NETTESHEIM,
Counsellor to CHARLES the Fifth,
EMPEROR of Germany:
AND
Iudge of the Prerogative Court.

Translated out of the Latin into the
English tongue, By J.F.



London, Printed by R.W. for Gregory Moule, and are to
be sold at the Sign of the three Bibles near the
West-end of Pauls. 1651.

Orontii Finæi, Delphi-

NATIS, REGII MATHEMA-
ticarum Lutetiae professoris, De duodecim
cali domiciliis, & horis inaequalibus,
Libellus non aspernandus.

VNA CVM IPSARVM DOMORVM,
atque inaequalium horarum instrumento, ad latitu-
dinem Parisiensem, hactenus ignota
ratione delineto.

LVTETIAE.

Apud Michaëlem Vascosanum, iuxta Iacobum
ad insigne Fontis.

M. D. LIII.

CVM PRIVILEGIO.

Oronce Finé.

The 28th of November 2008 Nicola Severino found a book by Oronce Finé, dated 1553. This was within two months of the other finds we are discussing in this article. This book is not a new discovery but the image of the tympan still was unknown to us. The title page of the book is seen here. The book is in Latin and has about 75 pages.

Fer J. de Vries
Van Gorkumlaan 39
5641WN EINDHOVEN
Netherlands
ferdevries@onsneteindhoven.nl